

IN THE CLAIMS

1. A hammermill for comminuting material comprising:

a) a housing defining an inlet, an outlet, and a substantially cylindrical cutting plate disposed therebetween, the inlet communicating with the cylindrical cutting plate to receive material to be comminuted, the outlet communicating with the cylindrical cutting plate to discharge the comminuted material, the cylindrical cutting plate biased to move the material through along the cutting plate in a substantially helical profile from the inlet to the outlet;

b) a rotor rotatably mounted within the housing about an axis of rotation; and

c) a plurality of hammers attached to the rotor, the hammers arranged in rows.

2. The hammermill of claim 1, further comprising the cutting plate having slots, wherein the slots are angled to direct the material across the working chamber and towards the outlet in a substantially helically profile.

3. The hammermill of claim 2, further comprising the substantially helical profile having a pitch, the pitch being adjustable by adjusting the angle of the cutting plate slots.

4. The hammermill of claim 1, wherein the hammers comprise tips, the tips having leading edges, wherein the leading edges are angled to direct the material across the working chamber and towards the outlet in a substantially helical profile.

5. The hammermill of claim 4, further comprising the substantially helical profile having a pitch, the pitch being adjustable by adjusting the angle of the hammers' leading edge.

6. The hammermill of claim 4, wherein the angle of the leading edges of the hammers is of the same degree as the angle of the cutting plate slots, but in the opposite direction, to direct the material across the working chamber towards the outlet in a substantially helical profile.

7. The hammermill of claim 1, wherein the hammers further comprise tips with a leading edge, the leading edge being substantially straight and perpendicular to the axis of rotation of the rotor.

8. The hammermill of claim 1, further comprising the helical working chamber
5 profile length being preferably 450 degrees.

9. The hammermill of claim 1, further comprising the helical working chamber profile length being between 270 degrees and 450 degrees.

10. The hammermill of claim 1; further comprising the helical working chamber profile length being greater than 450 degrees.

10 11. The hammermill of claim 2, wherein the cutting plate slot pattern and cutting plate slot angle may be adjusted to achieve the desired balance between the required degree of comminution and efficiency of movement of material through the hammermill.

12. The hammermill of claim 1, further comprising the hammers having hammer tips that clear the cutting plate at an adjustable distance in order to achieve the desired
15 balance between the required degree of comminution and efficiency of movement of material through the hammermill.

13. The hammermill of claim 12, further comprising the hammers having hammer tips with leading edges that clear the cutting plate at an adjustable distance, the leading edges being angled, wherein the cutting plate slot pattern and slot angle may be varied in
20 conjunction with the adjustable distance of the hammer tip and the angle of the hammer tip leading edge to achieve the desired balance between the required degree of comminution and efficiency of movement of material through the hammermill..

14. The hammermill of claim 13, further comprising adjustability of rotational speed of the rotor to achieve the required degree of comminution.

25 15. The hammermill of claim 2, further comprising a smooth cutting plate section disposed adjacent to the outlet to assist in the discharge of comminuted material.

16. The hammermill of claim 2, further comprising at least one row of hammers with straight edges to assist in the movement of material within the working chamber and in the discharge of comminuted material.

17. A hammermill for comminuting material, comprising:
- 5 a) a housing defining an inlet, an outlet, and a substantially cylindrical cutting plate disposed therebetween, the inlet communicating with the cylindrical cutting plate to receive material to be comminuted, the outlet communicating with the cylindrical cutting plate to discharge the comminuted material, the cylindrical cutting plate comprising angled slots to move the material through along the cutting plate in a substantially helical profile from the inlet to the outlet, and wherein the helical profile travel length is between 270 degrees and 450 degrees;
- 10 b) a rotor rotatably mounted within the housing about an axis of rotation;
- c) a plurality of hammers attached to the rotor, the hammers arranged in rows and comprise tips with leading edges, the tips clearing the cutting plate by an adjustable distance; and
- 15 d) wherein the cutting plate slot pattern, angle and density may be adjusted and further wherein the rotational speed of the rotor may be adjusted to achieve the required degree of comminution.
18. Hammers for a hammermill, comprising a tip with a leading edge, the leading edge being angled.
19. The hammers of claim 18, wherein the hammermill has cutting plates that
- 20 have angled slots therein, further comprising the leading edge of the hammers being angled to match the degree of the angle of the cutting plate slots, the leading edge of the hammer angle being opposite in direction to the angle of the cutting plate slots.
20. The hammers of claim 18, further comprising the leading edge of the hammers being angled, the angle being adjustable to achieve the desired balance between the required
- 25 degree of comminution and efficiency of movement of material through the hammermill.